

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: AFCJB37140

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Tiaroga cobitis*
COMMON NAME: Loach Minnow
SYNONYMS: *Cliola cobitis*, *Rhinichthys cobitis*
FAMILY: Cyprinidae

AUTHOR, PLACE OF PUBLICATION: Girard, C. 1857. Researchers upon the cyprinoid fishes inhabiting the freshwaters of the United States of America, west of the Mississippi valley, from specimens in the Museum of the Smithsonian Institution. Proceedings of the Academy of Natural Sciences of Philadelphia 8(1856):165-213.

TYPE LOCALITY: San Pedro River, Arizona.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: Monotypic genus

DESCRIPTION: Small stream dwelling minnow, rarely exceeding 65.0 mm (2.6 in.) in length. Elongated body is a little compressed, and flattened vertically. Mouth is small, terminal, and highly oblique with no barbels present. Upper lip is non-protractile and attached to the snout by a broad fold of tissue. Gill openings are restricted. Two rows of pharyngeal teeth, dental pattern is 1,4-4,1 (Minckley 1973).

Loach minnow have an olivaceous background coloration highly blotched with darker pigment. Whitish spots are present at the origin and insertion of the dorsal fin as well as the dorsal and ventral portions of the caudal fin base. A black basicaudal spot is usually present. There are 65 scales in the lateral line. The dorsal fin contains 8 rays, and the anal contains 7. Breeding males develop bright red-orange coloration at the bases of paired fins, on adjacent fins, on the base of caudal opening, and often on abdomen. Breeding females become yellowish in color on their fins and lower body (Minckley 1973).

AIDS TO IDENTIFICATION: Distinguished from the similar speckled dace by whitish spots that are present on the origin and insertion of the dorsal fin as well as on the dorsal and ventral portions of the caudal fin base.

ILLUSTRATIONS: B&W drawing (Marsh 1991:i.)
B&W photos (Minckley 1973:133)
Color line drawing (Page and Burr 1991)
Color photos (Rinne and Minckley 1991:16)
B&W photo (Wildlife Habitat Management Staff Group 1975:23)

TOTAL RANGE: Historically was endemic to Gila River Basin near and upstream of Phoenix, and included the Agua Fria, Gila, Salt, San Pedro, and Verde River systems in Arizona. They were also found in New Mexico, and Sonora, Mexico. Today in Arizona, they are found in Aravaipa Creek, the Blue River, and irregularly at the confluence of the north and east forks of the White River and the San Francisco River, between Clifton and the New Mexico border (Propst et al. 1985). In New Mexico, the loach minnow now occupies just over half of its range and is extirpated from Sonora, Mexico.

RANGE WITHIN ARIZONA: Historically in Arizona, the loach minnow occupied as much as 2,000 stream km (1,243 miles), but now are found in less than 200 stream km (124 miles) (Propst et al. 1987). Loach minnow are limited in Arizona to reaches in the Black River (Apache County), White River (Gila County), North and East forks of the White River (Navajo County), Aravaipa Creek (Graham and Pinal counties), San Francisco and Blue Rivers, and Campbell Blue and Eagle creeks (Greenlee County). Known populations once present in other rivers and streams of the state, have been extirpated.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Loach minnow are short lived. Few, if any, live through the fourth year. Populations of loach minnow vary both spatially and temporally because of natural changes in their environment and differing dynamic characteristics of individual populations.

REPRODUCTION: Spawning was observed to take place in late winter to early spring in Aravaipa Creek and from late March to early June in New Mexico. First spawn occurs in their second year. Spawning occurred in the same riffles that were occupied by adults during the non-reproductive season. Adhesive eggs are deposited on the underside of flattened rocks. The nest cavities are usually open on the downstream side while the upstream portion of the rock is embedded in the substrate. The male, and possibly the female, guards the nest cavity. The number of eggs per rock ranges from 5 to more than 250, with means of 52 to 63 (Marsh 1991). Individual females contain from 150 to 1200 mature ova. Eggs incubated at 18 to 20 °C hatched in five to six days.

FOOD HABITS: Loach minnow are opportunistic benthic insectivores, feeding mainly upon riffle-dwelling larval ephemeropterans, simuliid, and chironomid dipterans. They actively seek their food among bottom substrates, rather than pursuing items in the drift.

HABITAT: The cryptic, solitary, and sedentary loach minnow occupies turbulent, rocky riffles of mainstream rivers and tributaries. They prefer moderate to swift current velocity and gravel or cobble substrates. Sometimes associated with dense, filamentous green algae. It is restricted almost exclusively to a bottom dwelling habitat because of a reduced gas bladder.

ELEVATION: Up to about 8,240 ft (2513 m). Based off records in the Heritage Data Management System (HDMS), elevation ranges from 2,325 - 8,240 ft. (709 - 2513 m) (AGFD, unpublished data accessed 2001).

PLANT COMMUNITY: Prefers an open, low growing riparian type community composed mostly grass and shrubs.

POPULATION TRENDS: Loach minnow was once locally common throughout much of the Verde, Salt, San Pedro, San Francisco, and Gila (upstream from Phoenix) river systems, occupying both the mainstream and perennial tributaries up to about 2,200 m (7,218 ft.) elevation. This range has been dramatically reduced and fragmented, due to habitat destruction, and competition and predation by introduced fish species. It is now considered rare to uncommon in Arizona, except Aravaipa Creek and Blue River. The loach minnow is believed to be extirpated from Mexico, although the Gila River drainage in that country still lacks adequate surveys. Its distribution in New Mexico is fragmented. According to Marsh (1991), unknown populations of the loach minnow may still occur in places not surveyed or incompletely inventoried, especially in Mexico, and within the expansive San Carlos Apache and Fort Apache Indian reservations, or on National Forest lands.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE with CH (USDI, FWS 2012)
 [PE with Proposed CH, USDI, FWS 2010]
 [LT-USDI, FWS 1986]
 [Critical Habitat Removed (Court Order No. CIV 02-0199 JB/LCS, 08-31-2004)]
 [Critical Habitat Listed (USDI, FWS 2000)]
 [Critical Habitat Listed (USDI, FWS 1994)]

STATE STATUS: 1A (AGFD SWAP 2012)
 [WSC, AGFD, WSCA in prep]
 [State Threatened AGFD, TNW 1988]

OTHER STATUS: Forest Service Sensitive (USDA, A-S National Forest 2000)
 [Forest Service Sensitive, USDA, FS Region 3 1988]
 E, probably Extinct in the wilds of Mexico (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010).
 Listed Endangered (Secretaría de Medio Ambiente 2000)
 [Listed Endangered Secretaría de Desarrollo Social 1994]

MANAGEMENT FACTORS: Dewatering of stream reaches, impoundment, livestock grazing, habitat alteration, and introduced non-native fish have been the greatest threats to loach minnow populations. Non-native predatory fish species in particular include piscivorous catfishes (*Ictalurus punctatus*, *I. melas*, *I. natalis*, and *Pylodictus olivaris*), and the red shiner (*Notropis lutrensis*). **Management needs:** conserve, protect, and monitor existing populations; delineate priority waters; ameliorate impacts from nonnative predatory and competitive species from loach minnow waters; develop captive propagation techniques;

enhance or restore select habitats within historical range; reintroduce into select historical habitats.

PROTECTIVE MEASURES TAKEN: Listed Proposed Threatened (Endangered Species Act), with Proposed Critical Habitat under consideration as of October 28, 2010. A Loach Minnow Recovery Plan was prepared by the USFWS (1990). An artificial propagation project with loach minnow was completed in 2004.

SUGGESTED PROJECTS: Protect existing populations of loach minnow. Monitor status of existing populations. Identify nature and significance of interaction with non-native fishes. Quantify, through research, loach minnow habitat needs and the effects of physical habitat modification on life cycle completion. Enhance or restore habitats occupied by depleted populations. Reintroduce populations to selected streams within historic range. Determine quantitative criteria for describing a self-sustaining population. Consider contingency planning and preliminary investigations for captive holding, propagation and rearing. Information and education (USDI, FWS 1990).

LAND MANAGEMENT/OWNERSHIP: BIA; BLM - Safford Field Office; USFS - Apache-Sitgreaves National Forest; TNC - Aravaipa Canyon and Muleshoe Ranch Preserves; Private.

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Abarca, F.J. 1987. Seasonal and diel patterns of feeding in loach minnow. Proceedings of the Desert Fishes Council 19:20.
- Arizona Game and Fish Department. 1988. Threatened Native Wildlife in Arizona. p.27.
- Arizona Game and Fish Department. In prep. Wildlife of special concern in Arizona. Arizona Game and Fish Department Publication. Phoenix, Arizona. 32 pp.
- Arizona Game and Fish Department. 2012. Arizona's State Wildlife Action Plan 2012-2022. Phoenix, AZ.
- Britt, K.D. 1982. The reproductive biology and aspects of life history of *Tiaroga cobitis* in southwestern New Mexico. MS. Thesis, New Mexico State University. p. 56.
- Marsh, P.C., F.J. Abarca, M.E. Douglas, and W.L. Minckley. 1989. Spikedace and loach minnow relative to introduced red shiner. Center for Environmental Studies, and Department of Zoology, Arizona State University, Tempe, Arizona; Report to Arizona Game and Fish Department. p. 116.
- Marsh, P.C. 1991. Loach Minnow, *Tiaroga cobitis* Recovery Plan; for Region 2, U.S. Fish and Wildlife Service, Albuquerque, New Mexico. Arizona State University, Tempe, Arizona. pp. i-38.
- Minckley, W.L. 1965. Sexual dimorphism in the loach minnow, *Tiaroga cobitis*. Copeia 3:380-382.
- Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix. pp. 133-135.
- Minckley, W.L. 1980. *Tiaroga cobitis*, Girard, loach minnow in D.S. Lee, C.R. Gilbert, C.H. Hoatt, R.E. Jenkins, D.E. McAllister, and J.R. Stauffen (editors). Atlas of North

- American Freshwater Fishes. North Carolina State Museum of Natural History, Raleigh, North Carolina. p. 365.
- Page, L.M. and B.M. Burr. 1991. A field guide to freshwater fishes: North America, North of Mexico. Houghton Mifflin Co., Boston. p. 103.
- Propst, D.L., P.C. Marsh and W.L. Minckley. 1985. Arizona survey for spikedace and loach minnow: Fort Apache and San Carlos Apache Indian Reservations and Eagle Creek. In: Report to Office of Endangered Species, USFWS, Albuquerque, N.M.
- Propst, D.L., K.R. Bestgen and C.W. Painter. 1988. Distribution and status, biology and conservation of the loach minnow, *Tiaroga cobitis*, in New Mexico. U.S. Fish and Wildlife Service, Albuquerque, New Mexico, Endangered Species Report number 17. p. 75.
- Propst, D.L. and K.R. Bestgen. 1991. Habitat and biology of the loach minnow, *Tiaroga cobitis*, in New Mexico. *Copeia* 1991(1):29-38.
- Rinne, J.N. 1989. Physical habitat uses by loach minnow, *Tiaroga cobitis*, in southwestern desert streams. *Southwest Naturalist* 34(1):109-117.
- Rinne, J.N. and W.L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. U.S. Department of Agriculture, Forest Service, General Technical Report RM-206. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado p. 16.
- Schriber, D.C. and W.L. Minckley. 1981. Feeding interrelations of native fishes in a Sonoran Desert stream. *Great Basin Naturalists* 41(4):409-426.
- Secretaría de Desarrollo Social. 1994. Diario Oficial de la Federacion. p. 53.
- Secretaría de Medio Ambiente. 2000. Diario Oficial de la Federacion, PROY-NOM-059-ECOL-2000. p. 47.
- Secretaría de Medio Ambiente y Recursos Naturales. 2010. NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo.
- USDA, Forest Service Region 3. 1988. Regional Foresters Sensitive Species List.
- USDA, Forest Service. 2000. Apache-Sitgreaves National Forest Sensitive Species List.
- USDI, Fish and Wildlife Service. 1985. Endangered and Threatened Wildlife and Plants; proposal to determine the loach minnow to be threatened species and to determine its critical habitat. *Federal Register* 50(117):25380-25387.
- USDI, Fish and Wildlife Service. 1986. Endangered and Threatened Wildlife and Plants; determination of threatened status for the loach minnow. *Federal Register* 51(208):39468-39478.
- USDI, Fish and Wildlife Service. 1990. Loach Minnow Recovery Plan. Albuquerque, New Mexico. p. 38.
- USDI, Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; designation of critical habitat for the threatened loach minnow (*Tiaroga cobitis*). *Federal Register* 59(45):10898-10906.
- USDI, Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Spikedace and the Loach Minnow; Final Rule. *Federal Register* 65(80):24328-24372.
- USDI, Fish and Wildlife Service. 2010. Endangered and Threatened Wildlife and Plants; Endangered Status and Designation of Critical Habitat for Spikedace and Loach Minnow; Proposed Rule. *Federal Register* 75(208):66482-66552.

- USDI, Fish and Wildlife Service. 2010. Endangered and Threatened Wildlife and Plants; Endangered Status and Designation of Critical Habitat for Spikedace and Loach Minnow; Final Rule. Federal Register 77(36):10810-10932.
- Vives, S.P. and W.L. Minckley. 1990. Autumn spawning and other reproductive notes on loach minnow, a threatened cyprinid fish of the American Southwest. Southwest Naturalist 35(4):451-454.
- Wildlife Habitat Management Staff Group. 1991. Endangered and unique fish and wildlife of the southwestern national forests. U.S. Department of Agriculture, Forest Service, Southwestern Region. pp. 23-24.

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ADDITIONAL INFORMATION:

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